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Rotational diffusion of magnetic nanorods in 2D viscous media. A. ANGUELOUCH, N. CAPALLO, R.L. LEHENY, D.H. REICH, DEPT. OF PHYSICS AND ASTRONOMY, THE JOHNS HOPKINS UNIVERSITY, BALTIMORE, MD TEAM — Recent theory has predicted fundamental changes to the hydrodynamic behavior of an anisotropic colloidal particle when it is confined to a thin fluid film [1]. These predictions potentially impact numerous areas, including the behavior of protein rafts and other structures embedded in biological cell membranes. As an idealized realization of such a system, we have studied the rotational drag on ferromagnetic nanowires in thin films of silicone oil on aqueous surfaces. These nanowires are highly cylindrical particles grown by electrochemical deposition with precisely controllable diameters ranging from 10-500 nm and lengths up to 50 microns. Particle tracking techniques to monitor their response to time-varying magnetic fields enables precise determination of rotational diffusion coefficients as a function of nanowire geometry and the oil film thickness. The scaling of the rotational diffusive behavior with nanowire dimensions permits a direct test of the predicted dimensional crossover. [1]A. J. Levine, T.B. Liverpool, and F.C. MacKintosh, Phys. Rev. E **69**, 021503 (2004)

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